



Important point in those undergoing peritoneal dialysis: Treatment compliance

Treatment compliance in peritoneal dialysis

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Abstract

Aim: This descriptive study was conducted to determine the levels of treatment compliance of those undergoing peritoneal dialysis. **Material and Method:** This study was conducted with 93 patients who agreed to participate in the study and began peritoneal dialysis (PD) at least six months prior to the study, among a total of 109 patients followed in the peritoneal dialysis unit of a city for one year. The data of the study were collected using a questionnaire and a check form containing information about peritoneal dialysis and disease management-related practices of those undergoing peritoneal dialysis. The study was conducted after obtaining the Institutional Permit, Ethics Committee Approval, and the written and oral consent of the participants. **Results:** The average age of the participants in the study was 53.75 ± 13.96 , 53.8% of them were male, 75.3% were married, and 43% were primary school graduates. Mean diagnosis time of the patients was 6.88 ± 5.78 years and the mean time to start the peritoneal dialysis was 3.85 ± 3.30 years. It was determined in the study that the treatment compliance levels of those undergoing peritoneal dialysis and their compliance with most of the application steps of peritoneal dialysis were high, but their compliance with some application steps (such as wearing a mask) and in weight/fluid follow-up were low. **Discussion:** As a result of the study, we recommend monitoring the compliance of those who are undergoing peritoneal dialysis regularly or intermittently, and planning interventions that increase their levels of compliance with treatment.

Keywords

Peritoneal Dialysis; Treatment Compliance; Peritonitis

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Introduction

In parallel with the increase in chronic diseases, the incidence rate of end-stage renal failure has also gradually increased. According to the Global Burden of Disease Study of 2010, chronic renal failure rose from 27th place to 18th place among all deaths [1]. More than 2 million people with this disease around the world require renal replacement therapy to survive [2]. According to the data of the National Institute of Diabetes and Digestive and Kidney Diseases, for the year of 2013, 63.7% of the patients with end-stage renal failure underwent hemodialysis, 6.8% received peritoneal dialysis treatment, and 29.2% had kidney transplantation [3].

Peritoneal dialysis has a better prognosis and lower cost and is easier to apply compared to hemodialysis [4]. Studies report that the overall quality of life, level of maintaining the social life, and work productivity are higher in the patients undergoing peritoneal dialysis and their mortalities are lower compared to patients undergoing hemodialysis [4,5]. Despite these positive aspects of peritoneal dialysis, infectious complications like peritonitis and tunnel infection and many non-infectious complications such as fluid-electrolyte, acid-base imbalance, obesity, lipid disorders, and cardiovascular problems can be seen [6]. These complications can lead to the termination of the treatment, an impaired quality of life, and the threat of mortality [7]. In particular, continuous or recurrent peritonitis episodes increase mortality of patients undergoing peritoneal dialysis at the rate of 2-15% and their hospitalizations at the rate of 33% [8]. In a previous study, it was reported that 42.2% of the patients who underwent peritoneal dialysis started to receive hemodialysis treatment due to developed peritonitis [9].

The treatment compliance level of the patients undergoing peritoneal dialysis is very important in avoiding the mentioned complications and in maintaining a successful treatment process. The issue of treatment compliance negatively affects the maximum well-being that can be achieved by dialysis treatment and can lead to serious problems in the long run [8]. As a matter of fact, it is reported in the literature that the patients with a low compliance level have high mortality rates, more frequent transition to hemodialysis due to uremia, longer hospitalization, and longer stays in the hospital. It was observed in the studies that patients undergoing peritoneal dialysis did not have an adequate level of compliance with the treatment [10-12]. In a systematic multi-study review investigating the treatment compliance status of patients undergoing peritoneal dialysis, it was determined that 3.9-85% of them did not follow the drug therapy and 14.4-67% did not follow the dietary and fluid restriction [10]. In another study on patients undergoing peritoneal dialysis, peritonitis developed in 60% of the patients with low treatment compliance, more than one peritonitis episode was seen in 40% of these patients and peritonitis did not develop in the patients with good compliance [13].

In their study, Russo et al. found that 23% of the patients undergoing peritoneal dialysis were not compliant with the bag exchange protocol and 11% were not compliant with the exit procedures and this was associated with peritonitis. In the same study, 47% of the patients stated that they needed to receive the training again [11].

Compliance of peritoneal dialysis patients with treatment and application steps directly affect the success of the dialysis procedure and the prevention of complications. However, when the literature is examined, most research focuses on the clinical situation of the patients [14-16]. The aim of this study was to determine the compliance problems of those undergoing peritoneal dialysis with its application steps and treatment. We determined the specific steps for which patients experienced compliance problem; this information should help improve future trainings and interventions.

Material and Method

This descriptive study was conducted to determine treatment compliance of patients undergoing peritoneal dialysis. The study was conducted with 93 people (80 patients, 13 patients' relatives) who agreed to participate in the study and who had started peritoneal dialysis at least six months prior, among a total of 109 patients followed up in the peritoneal dialysis unit in a city for one year.

The data of the study were collected using a questionnaire form prepared by the researcher following a literature review [10-14] and getting an expert opinion, and a check form containing knowledge and practices about compliance of those undergoing peritoneal dialysis with treatment and peritoneal dialysis application steps. The questionnaire involved 36 questions pertaining to the individuals' sociodemographic characteristics and knowledge about the disease. The check form consisted of 6 sections and 41 items. The options for each item were "I do," "I do not," "I sometimes do." The first 7 items contained information about hygienic steps, items 8-20 about dressing techniques, items 21-24 about the properties of the peritoneal dialysis room, items 25-34 about bag exchange procedure, items 35-37 about fluid follow-up, and items 38-41 about nutritional status. In order to assess the functioning of the prepared questionnaire and check form, preliminary application was made with 5 patients undergoing peritoneal dialysis; these patients were not included in the study.

Before starting the study, the Institutional Permission, Ethics Committee Approval (2014/460), and verbal and written informed consent from the patients participating in the study were obtained. The data of the study were assessed in the SPSS 21.0 (Statistical Package for the Social Sciences) software. Number of units (*n*), percentage (%), mean (\bar{X}), and standard deviation (*SD*) were used in the statistical analysis.

Results

The average age of the patients who underwent peritoneal dialysis was 53.75±13.96, mean diagnosis time was 6.88±5.78 years, and length of time PD was applied 3.85±3.30 years. 53.8% of the patients were male, 75.3% were married, 43.0% were primary school graduates, 68.8% had a middle income level, 64.5% were living in the city, 38.7% were housewives, and 47.3% were smokers. It was also found that 88.2% of the patients had another chronic disease, 71% had hypertension, 83.9% were independent in conducting their activities of daily living, and all of them received training about the disease and peritoneal dialysis (Table 1).

Table 1. Descriptive characteristics of patients who underwent peritoneal dialysis (N=93)

Characteristics	Min- Max	$\bar{X} \pm SS$	n	%
Age	19.0-77.0	53.7±13.9		
Mean diagnosis time (year)	0.6-26.0	6.8±5.7		
Average application time of peritoneal dialysis (year)	0.5-15.0	3.8±3.3		
<hr/>				
<u>Gender</u>				
Female	43	46.2		
Male	50	53.8		
<u>Marital status</u>				
Married	70	75.3		
Single	23	24.7		
<u>Education status</u>				
Literate / Illiterate	15	16.1		
Primary school	40	43.0		
High school	26	28.0		
University	12	12.9		
<u>Living place</u>				
Village	13	14.0		
Town	20	21.5		
City	60	64.5		
<u>Income level</u>				
Good	17	18.3		
Moderate	64	68.8		
Bad	12	12.9		
<u>Occupational status</u>				
Housewife	36	38.7		
Retired	32	34.4		
Unemployed	11	11.8		
Other (Governmental officer, farmer, student, chauffeur, business)	14	15.1		
<u>Smoking status</u>				
Still smoking	18	19.4		
Gave up smoking	31	33.3		
Not smoking	44	47.3		
<u>Additional chronic disease</u>				
Present	82	88.2		
Absent	11	11.8		
<u>Chronic Diseases</u>				
Hypertension				
Diabetes	66	71		
Coronary artery disease - Congestive heart failure	40	43		
COPD and asthma	31	33		
Other (Rhythm impairment, osteoporosis, hyperthyroidism, hepatitis B)	6	6.5		
	11	11.8		
<u>ADL</u>				
Dependent	3	3.2		
Semidependent	12	12.9		
Independent	78	83.9		

With regard to the treatment compliance-related characteristics of the patients, 91.4% used their drugs regularly, 89.2% never skipped the dialysis, 91.4% measured their blood pressure by themselves at home, 32.9% watched their blood pressure regularly every day, and 32.9% performed the measurement whenever they felt uncomfortable. 47.1% of the patients gave the answer to the question about the biggest advantage of peritoneal dialysis as "It can be applied at home" and 24.7% stated the reason for choosing peritoneal dialysis as "It is easier to control" (Table 2).

In the compliance with the application steps of peritoneal dialysis, nearly all of them followed the general hygiene rules (86.0% washed their hands, 88.2% changed their underwear daily, all of them were careful about having short and clean nails, etc.) but 69.9% did not wear a mask during the dressing or dialysis.

Table 2. Treatment compliance-related characteristic of the patients who underwent peritoneal dialysis (N=93)

Characteristics	n	%
Use of medicines regularly		
Use regularly	85	91.4
Not use regularly	8	8.6
Measure their blood pressure by themselves		
Measure	85	91.4
Not measure	8	8.6
<hr/>		
<u>Blood pressure measurement frequency (n=85)</u>		
Regularly every day	28	32.9
2-3 per week	14	16.6
Once a week	11	12.9
Once a month	4	4.7
When feeling discomfort	28	32.9
<u>Apply dialysis regularly</u>		
Apply regularly	83	89.2
Not apply regularly	10	10.8
<u>Biggest advantage of peritoneal dialysis (n=85)</u>		
It can be applied at home	40	47.1
Not dependent on the hospital	31	36.5
Comfortable be applied	14	16.4
<u>Reason for choosing peritoneal dialysis (n=89)</u>		
Doctor's advice	26	29.2
It can be applied at home	41	46.1
Easier to control	22	24.7

Most of the participants applied the dressing techniques correctly (92.5% disinfected their hands before the process, 94.6% wiped the removal area of catheter one time from the center to peripheral with circular movements, etc.) and most of them paid attention to the properties of the peritoneal dialysis room (the room of 74.2% was cleaned every day, 81.7% did not keep many items in their room, and 94.6% ventilated the room every day, etc.) (Table 3).

In the study, it was determined that 87.1% of the participants followed the necessary steps before, 62.4% measured the fluid they took, 96.8% recorded whether the fluid was fuzzy and fibrinous or not, and 93.5% evaluated their orbital area, wrists and ankles in terms of edema. However, 67.7% did not keep records for weight and fluid follow-up, and 60.2% did not weigh themselves with the same clothes at the same time every day (Table 3).

When examining the nutritional status of the patients, it was determined that 68.8% of them consumed low-carbohydrate food, 77.4% consumed foods with low fat and without salt, and 80.6% did not use frying and roasting method as their cooking method (Table 3).

Discussion

In order to apply peritoneal dialysis without any complication and successfully, patient compliance is very important. It was determined in the present study that almost all of the patients obeyed the general hygiene rules, but most of them did not wear a mask during the procedure (Table 3). When examining the published studies about following the general hygiene rules, primarily studies on hand washing have been found [17,18]. It was determined in the present study that 14.0% of those undergoing peritoneal dialysis did not wash their hands before the dialysis. Among the studies, Mawar et al. reported that 24% of the patients undergoing peritoneal dialysis did not wash their hands before the dialysis, whereas Russo et al. stated that 6% did not wash their hands before the dialysis [11-13].

Table 3. Compliance status of those undergoing peritoneal dialysis to the application steps of peritoneal dialysis

General Hygiene Rules	I do n (%)	I do not n (%)	I sometimes do n (%)
I always wash my hands thoroughly before the dialysis.	80 (86.0)	2(2.2)	11(11.8)
I always wear a mask during the dressing and dialysis.	19 (20.4)	65(69.9)	9(9.7)
I take a shower as bath.	53(57.0)	32(34.4)	8(8.6)
After the bath, I dry the catheter exit site thoroughly and replace the dressing.	88(94.6)	2(2.2)	3(3.2)
I change my underwear every day.	82(88.2)	1(1.1)	10(10.8)
I do not wear tight clothes.	89(95.7)	4(4.3)	0(0.0)
I pay attention for my nails to be short and clean.	93(100.0)	0 (0.0)	0(0.0)
Dressing techniques			
I wipe my table that I use during the dressing with a suitable disinfectant.	76(81.7)	11(11.8)	6(6.5)
I prepare my necessary materials.	89(95.7)	2(2.2)	2(2.2)
I cut the non-allergic band in advance.	88(94.6)	3(3.2)	2(2.2)
I wash my hands preferably with a disinfectant liquid soap.	80(86.0)	4(4.3)	9(9.7)
I open the sterile gauze package.	88(94.6)	2(2.2)	2(2.2)
I disinfect my hands.	86(92.5)	2(2.2)	5(5.4)
I pour batticon without touching the gauze.	85(91.4)	3(3.2)	5(5.4)
Starting with the exit site of the catheter, I wipe once with circular outward movements.	88(94.6)	1(1.1)	4(4.3)
I repeat this process with new gauze.	86(92.5)	6(6.5)	1(1.1)
I wait for the place I wipe to dry out.	91(97.8)	1(1.1)	1(1.1)
I close the gauze on the exit site without touching it.	91(97.8)	1(1.1)	1(1.1)
I stick the non-allergic band.	92(98.9)	0 (0.0)	1(1.1)
I am careful that the catheter does not move	93(100.0)	0 (0.0)	0 (0.0)
Properties of peritoneal dialysis room			
I clean the floor of the room every day.	69(74.2)	3 (3.2)	21(22.6)
I do not keep a lot of stuff in the room.	76(81.7)	8 (8.6)	9(9.7)
I do not allow anyone else to enter the room during the dialysis.	71(76.3)	11 (11.8)	11(11.8)
I ventilate my dialysis room every day.	88(94.6)	3 (3.2)	2(2.2)
Bag exchange procedure			
I wash my hands before the procedure.	87 (93.5)	3 (3.2)	3(3.2)
Before starting the exchange process, I close the door and window of the room.	89 (95.7)	4(4.3)	0 (0.0)
I pay attention to the heat of the bag. (n=86)	82 (88.2)	2(2.2)	2(2.2)
I remove the dialysate inner bag without touching anywhere with my hand.	87 (93.5)	2(2.2)	3(3.2)
I check the exchange solution before making the catheter connection (expiry date, blur etc.).	81 (87.1)	8(8.6)	4(4.3)
I weigh intake and removed fluid amounts. (n=86)	58 (62.4)	13(14.0)	15(16.1)
I check to see if the removed fluid is blurry, fibrinous, bloody or not.	90 (96.8)	1(1.1)	2(2.2)
I wash my hands with antiseptic solution after the procedure is over.	89 (95.7)	1(1.1)	3(3.2)
I dispose of the wastes properly.	93 (100.0)	0 (0.0)	0(0.0)

If the catheter is contaminated for any reason during the procedure, I terminate the procedure immediately and call the dialysis center. (n=89)	76 (81.7)	1(1.1)	2(2.2)
Fluid Follow-up			
I weigh myself with the same clothes at the same time every day.	19 (20.4)	56(60.2)	18(19.4)
I keep records in the record book about my weight and fluid follow-up.	16 (17.2)	63(67.7)	14(15.1)
I evaluate my orbital area, wrist and ankle in terms of edema.	87 (93.5)	4 (4.3)	2 (2.2)
Nutrition			
I consume foods that are low in carbohydrates.	64(68.8)	10 (10.8)	19(20.4)
I consume low-fat food and dishes.	72 (77.4)	9 (9.7)	12 (12.9)
I consume salt-free food and dishes.	72 (77.4)	10(10.8)	11(11.8)
I do not use frying and roasting methods for cooking.	75 (80.6)	7 (7.5)	11(11.8)

The results of the present study are similar to the literature. The reason for high rate of hand washing is thought to be the fact that the importance of hand washing was emphasized in the training given before applying the peritoneal dialysis.

Not wearing a mask during peritoneal dialysis is a well-known cause of peritonitis [8]. As a matter of fact, in their studies, Dong and Chen reported that not wearing a mask was an independent factor in the first peritonitis episode, and not wearing a mask increased the risk of peritonitis by 5 times [12]. In the present study, the step among the general hygiene rules with lowest compliance was mask-wearing, with failure to wear a mask at the rate of 69.9%. Similar to the present study, in their study Mawar et al. reported that more than half of the patients (68%) did not wear any mask during the procedure [13]. Unlike the result of the present study, Dong et al. reported that 11% of the patients forgot to wear a mask in their study, and Russo et al. reported that only 6% of the patients did not wear any mask [11,12].

In the prevention of infections induced by peritoneal dialysis, evaluation of the catheter removal region and ensuring hygiene are very important [19]. In the present study, almost all of the patients (81.7-100.0%) were found to apply the dressing techniques correctly (Table 3). Russo et al. determined in their study that 11% of the patients did not obey the catheter removal site protocol [11]. Sayed et al. found that only 12% of the patients performed daily care of catheter removal site [20]. Results of the present study are similar to the literature.

The setting that best facilitates the peritoneal dialysis treatment compliance is a comfortable and reliable home environment. It is also emphasized in the literature that the home environment is as important as the knowledge and skills associated with peritoneal dialysis. One study reported that the patients with high knowledge and skills paid attention to suitability of the environment where they performed peritoneal dialysis and their risks of developing peritonitis were lower [21]. It was determined in the present study that most of the patients undergoing peritoneal dialysis paid attention to the properties of the peritoneal dialysis room (74.2-94.6%) (Table 3). Unlike the present study, in their study Sayed et al. reported that only 34% of the patients had the appropriate home environment [20].

Mawar et al. found that 42% of the patients did not clean the surface of the environment where they applied peritoneal dialysis [13]. As the suitability of the home environment and the hygiene can vary depending on the cultural environment and financial possibilities of the individuals, it can be considered that the results of the studies may be different due to these factors. It is stated in the literature that, for patients undergoing continuous ambulatory peritoneal dialysis (CAPD), there is a correlation between compliance with the bag exchanging technique and treatment and peritonitis incidence [11]. In the present study, most of the participants were found to follow the bag exchanging procedure (Table 3). Russo et al. reported in their study that 23% of the patients did not follow the bag exchanging procedures [11]. In their study, Bernardini et al. found that 84% of the patients did not obey the bag exchanging procedure and needed the training again [22]. The results of the present study are not similar to the studies in the literature. This is thought to be caused by the differences in cultural characteristics, age, and residence place of those undergoing peritoneal dialysis.

Dietary restriction is a major burden in patients with renal failure. In their study, Yu et al. reported that 26% of the patients knowingly did not obey the dietary restriction and 26% did not follow it due to forgetfulness [23]. Lam et al. also stated in their study that 62% of the patients did not obey the dietary restriction [24]. Unlike the literature, in the present study it was found that the most of the patients followed dietary restrictions, low-salt, low-fat food intake, and appropriate cooking methods (Table 3). It can be considered that this difference was affected by the cultural eating habits of individuals depending on the countries where they are living.

Inadequate compliance with treatment is an important problem that complicates the management of chronic diseases [3]. In particular, regular use of medications has a direct effect on treatment success. It is known that as compliance to medication decreases, the frequency of hospitalizations and health-care costs increase [25]. In the systematic multi-study review conducted by Griva et al. to investigate compliance with medication by peritoneal dialysis patients, 3.9%-85% experienced problems [10]. In their study, Yu et al. determined that 15% of the patients knowingly did not use their drugs regularly and 20% did not use their drugs regularly since they forgot [23]. Unlike the literature, it was determined in the present study that 91.4% of the patients used their drugs regularly (Table 2). It was considered that this difference was associated with the fact that the patients were routinely monitored through phone calls by the peritoneal dialysis unit where the present study was conducted.

In the present study, it was found that 89.2% of the patients undergoing peritoneal dialysis performed it regularly. Yu et al. determined in their study that 14% of the patients shortened the peritoneal dialysis time period by themselves and 10% had intermittently skipped the dialysis session within the last four weeks [23]. Lam et al. reported that 7% of the patients experienced problems in their compliance with dialysis procedures [24]. Overall, the studies observed that a great majority of the patients undergoing peritoneal dialysis were aware of the importance of dialysis continuity.

Conclusion

This study found that those undergoing peritoneal dialysis had high levels of compliance with treatment and compliance with most application steps of peritoneal dialysis, but had lower compliance to some application steps (such as wearing a mask) and weight / fluid follow-up.

As a result of the study, we recommend regularly evaluating the treatment compliance levels of those who undergo peritoneal dialysis and planning more-comprehensive studies in which the procedure steps are observed instead of being self-reported. We also recommend investigating the particular steps for which compliance is low, and why, and evaluating the difficulties in maintaining the treatment via home visits and tele-health services, in order to increase compliance by directing support sources appropriately and ensuring the continuity.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

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Conflict of interest

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